Prosodic domains: overthrowing the hierarchy
Heather Newell\textsuperscript{1} & Tobias Scheer\textsuperscript{2}
\textsuperscript{1}UQAM, \textsuperscript{2}Université Côte d'Azur

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1.0 Phonological domains.

Phonological domains within and across words have been objects of study since the beginning of Generative Phonology (and before). The delimiters of these domains have prominently included the non-segment segments # and +, which were replaced by the Prosodic Hierarchy in the 80s.

1.1 The diacritic nature of the prosodic hierarchy

- In a modular environment, diacritics do not qualify since computational systems (modules) can only understand, parse and process their own proprietary vocabulary.
• \( \omega, \varphi \) etc. are diacritics exactly in the same way as \#, + etc.: they play no role in phonological processes that make no reference to morpho-syntactic information. Their only import is the contribution of morpho-syntactic information.

• \( \Rightarrow \) \( \omega, \varphi \) etc. are not pieces of the proprietary phonological vocabulary.

• the Direct Effect: diacritics such as \( \omega, \varphi \) etc. have no effect by themselves. They therefore make the wrong prediction, i.e. that morpho-syntactic divisions can have any effect and its reverse.
  
  o Their effect can be anything and its reverse: a rule (or constraint) mentioning \# or \( \omega \) can make word-initial consonants strong or weak.

  o This is not how natural language works, though: particular morpho-syntactic divisions do have specific and non-interchangeable effects. The beginning of the word makes consonants strong, never weak. It enforces \#TR groups, never \#RT groups. It prevents the first vowel from alternating with zero, but never forces it to alternate with zero.

  o Truly phonological objects are necessarily interpreted by the phonology by their sole presence. They make predictions: anything and its reverse cannot happen in their vicinity. If carriers of morpho-syntactic information is syllabic space (the initial CV), specific predictions are made – for the beginning of the word, these predictions are correct: \#C strong, restriction to \#TR, first vowels cannot alternate.

1.2 The prosodic hierarchy is redundant
D'Alessandro and Scheer (2015)

• phase theory (Chomsky (2001) and following) has radically modified the landscape (but this went by and large unnoticed in phonological quarters)
  
  o since Lexical Phonology, post-lexical phonology is supposed to be non-cyclic. Hence at and above the word level, chunk definition is ONLY representational, i.e. done by the Prosodic Hierarchy.

  o phase theory obliterates this idea: it defines phonologically relevant chunks above the word level.

  o \( \Rightarrow \) phase theory takes over the function of the Prosodic Hierarchy
the Prosodic Hierarchy is redundant and has to go

- reaction/adaptation of the established Prosodic Hierarchy to phase theory: **prosodic islands.**
- ==> abandon of THE fundamental claim of Prosodic Phonology: non-isomorphism.
- theory cannot afford to do the same labour twice: if prosodic and phase structure are exactly identical and isomorphic, Occam commands to get rid of one of them. Since phases are independently needed in syntax and the Prosodic Hierarchy has no other purpose in phonology than introducing morphosyntactic information, prosodic constituency has to go. Pak (2008: 42ff), Samuels (2009: 284ff), Seidl (2001).

1.3 Phonological domains. Phono-syntactic (non-)isomorphism

Newell (2017a)

- \(X^0\) does not define a PWd. It’s both too big and too small. Current theories of the Prosodic Hierarchy do not rest on solid theoretical ground. There is no such thing as *word.*
- “The set of Match constraints ... exploit... the notions clause, phrase and word, which presumably **play a role in any theory of morphosyntax.**” Selkirk (2011).
- PWds are both smaller and larger than \(X^0\)s.
- Phonological domains are isomorphic with syntactic domains. Selkirk (2011), Newell (2017a)
2.0 **A non-diacritic alternative: The initial CV.**

- There is only one chunk-defining mechanism: phases.
- \( \Rightarrow \) no parallel phonology-internal mechanism (prosodic constituency)
- Hence phonological domains are isomorphic with syntactic domains.
- Syntactic (and hence phonological) domains are created in the syntax: phases.
- But not all phases leave a phonological trace:
  o each individual phase may or may not be specified for phonologically marking its domain with an initial CV (= extra syllabic space).
  o marking is always initial: there is no phase-final marking.
- Phase head marking

  - phase heads \( \alpha \) and \( \delta \) are endowed with a an initial CV
  - phase heads \( \beta \) and \( \gamma \) trigger vacuous spell-out at PF

\[
\begin{align*}
\delta &\rightarrow PF + CV \\
\gamma &\rightarrow PF \\
\beta &\rightarrow PF \\
\alpha &\rightarrow PF + CV
\end{align*}
\]
3.0 OJIBWE HIATUS RESOLUTION.

Ojibwe hiatus resolution is a complex pattern that is sensitive to the syntactic derivation in which it arises, as well as to the phonological shape of affixes. Newell and Piggott (2014).

<table>
<thead>
<tr>
<th></th>
<th>HIATUS VIA PREFIXATION</th>
<th>HIATUS VIA SUFFIXATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>V1 and V2 in different cycles</td>
<td>VV-V(V) ( \Rightarrow ) VVV(V)</td>
</tr>
<tr>
<td>(B)</td>
<td>V1 is short: epenthesis</td>
<td>V-V ( \Rightarrow ) VdV</td>
</tr>
<tr>
<td>(C)</td>
<td>A short V1 is deleted if it undergoes spell-out in the same cycle as V2 out in the same cycle as V2</td>
<td>V-V ( \Rightarrow ) V</td>
</tr>
<tr>
<td>(D)</td>
<td>Deletion of V2</td>
<td></td>
</tr>
</tbody>
</table>

(V-V \( \Rightarrow \) V)
Neither quality nor quantity are significant

Note that hiatus targets both prefixes and suffixes, and that in these cases the root V is always maintained. In root-root compounds hiatus is also resolved via deletion, but V1 may be deleted.\(^1\)

3.1 THE DATA. Newell and Piggott (2014)

(A) Long V + V, no hiatus resolution

(1) gii-aagam-osee \( \Rightarrow \) giiaagamosee ‘He walked in snowshoes’
PAST-snowshoe-walk (333)

---

\(^1\) Hiatus resolution also never occurs across a modifier-base boundary. For the particular procedural nature of this boundary see Newell and Piggott (2014), Newell (2009).

(i) ni-ini-a:gam-ose: \( \Rightarrow \) (niidI)(m)(á:)(gamó)(sè:) ‘I walked away in snowshoes’
1-away-snowshoe-walk
(B) Hiatus resolved by epenthesis

(2) a. ni-aagam-osee → nidaagamosee, *niaagamosee  ‘I walk in
snowshoes’

1-snowshoe-walk

b. ni-ga-aagam-osee → nigadaagamosee  ‘I will (probably) walk in
snowshoes’

1-FUT.PROBABLE-snowshoe-walk

(C) Hiatus resolution by Deletion: Prefix in the same cycle as its base

(3) ni-oos → noos  ‘my father’

1-father

(D) Hiatus resolution by deletion: Suffix vowel is deleted (categorical)

(4) a. namee-ag → nameeg  ‘sturgeons’

sturgeon-PLURAL

b. aseemaa-eens → aseemaans  ‘cigarette’

tobacco-DIMINUTIVE

3.2 THE PHONO-SYNTACTIC ANALYSIS

Newell and Piggott (2014)

At the interpretation of a phase (vP, nP, CP, DP), a PWd is projected. The Ojibwe word emerges as nested PWds within a DP or a CP (see also Compton and Pittman (2010)). Hiatus is resolved only within a PWd.

(A) Long V + V, no hiatus resolution

PAST-snowshoe-walk

b. PW

PW

PW

(gii) (aa)(gamo)(see)
(B) Hiatus resolved by epenthesis

\[(\text{ni-[ga-[aagam-osee]]}_\text{TP} \rightarrow \text{nigaadagamosee})\]

1-FUT.PROBABLE-snowshoe-walk

‘I will (probably) walk in snowshoes’

\[(\text{ni oos} \rightarrow \text{noos})\]

‘my father’

(C) Hiatus resolution by Deletion

\[(\text{ni oos} \rightarrow \text{noos})\]

‘my father’

\[\text{DP} \rightarrow \text{PW}\]

2 As the tense and person prefixes are in separate phases, this derivation actually occurs in 3 steps.

(i) \[[(\text{aa})(\text{gamo})(\text{see})]_{\text{PWd}(\text{TP})}\]

(ii) \[[(\text{gadaa})(\text{gamo})(\text{see})]_{\text{PWd}(\text{TP} = \text{complement of CP})}\]

(iii) \[[(\text{niga})(\text{daa})(\text{gamo})(\text{see})]_{\text{PWd}(\text{CP} = \text{edge})}\]
(D) Hiatus resolution by deletion: Suffix vowel is deleted (categorical)

(8) a. \( \text{ni-3ii}\text{fib-im-inaani-ag} \rightarrow \text{ni3ii}\text{fibiminaanig} \) ‘our ducks’

1-duck-POSSESSIVE-AGR-AGR

b. 

```
  DP
 /   \  \\
1P pro  D
    /\    /\  \\
   ni  nP  nP
        /\    /\  \\
       n AgrP\_2
          /\    /\  \\
         Agr\_2 Agr\_1
            /\    /\  \\
           Agr\_1 Agr\_1
              /\    /\  \\
             Poss Poss
                /\    /\  \\
               n im n im

DUCK 3ii\text{fib}
```

• According to Newell & Piggott (2014), all suffixes emerge at the right edge of their base due to head movement. Therefore, all suffixes are in the same phase as their base. Hiatus resolution within the spell-out of a phase is always resolved through deletion.
3.3 **An Issue: Suffixation Inside and Outside the Phase**

The problem with the PWd account

- We adhere to the above account, but question the appeal to the PH /PWd as the representational device that differentiates the different hiatus resolution environments in the Phonology.
- A problem with the above account, besides the appeal to the PH, is that **not all suffixes in the language emerge in the same phase as their base**. Hiatus between suffixes and their base, like between prefixes and their base, should be resolved by epenthesis if the PWd account is correct, but hiatus is never resolved by epenthesis between a suffix and its base.
- Data from Lochbihler (2017), originally from Kaye and Piggott (1973) demonstrates this distinction.
  - There are 2 /-i/ suffixes in Ojibwe that trigger palatalization. There is also an apocope operation that can serve to delete both /-i/’s on the surface. Some derivations result in transparent surface realizations (9a), and some are opaque (9b).

\[(9)\]

<table>
<thead>
<tr>
<th></th>
<th>(9a)</th>
<th>peem-aat-isi-t-i → peemaatisit ‘he who lives’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(9b)</td>
<td>ni-mikškaw-at-i → nimikškawatf ‘I am frozen’</td>
</tr>
</tbody>
</table>

- Lochbihler notes that the /-i/ that is inside the (vP) domain of its base triggers palatalization before apocope applies, the /-i/ that is outside the domain of its base is deleted before palatalization can apply.

\[(10)\]

<table>
<thead>
<tr>
<th></th>
<th>(10a)</th>
<th>[[pe;m-a:t-isi-t vP] -i CP] /-i/ ‘RELATIVISER’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(10b)</td>
<td>[ni- [mikškaw-at-i vP] CP] /-i/ ‘ANIMATE INTRANSITIVE VERB (VAI)’</td>
</tr>
</tbody>
</table>

- If some suffixes can sit outside of the phase to which they merge, then we must re-examine the analysis of the syntactic position of the suffixes in Newell and Piggott 2014.
- The outer /-i/ suffix; the relativiser, never occurs before a V-final morpheme, so we cannot test how hiatus behaves in examples such as (9/10a)
- There are other good candidates for suffixes that emerge outside the first phase of interpretation in Ojibwe.
Inalienable possessive structures do not motivate n to D movement (as is the case in English – [the phonologist’s [analysis]nP ]DP ).

(11) \[ni-[akwe:]_{nP}{\text{-im}}_{DP} \rightarrow nida:\text{we:m}\] 1-woman-POSS

- The productive(syntactic) causative is proposed to sit outside of the inner vP. We can see the effect of this outer spell-out in many languages (Malagasy, Japanese, etc)

(12) \[ni[gi:we:]_{vP}{\text{-a:}}_{vP} \rightarrow nigi:we:a:\] ‘I make him go home’ 
1-go home-CAUS-him
(N&P p. 233)

(13) a. \[m-an-fatra \rightarrow mamatra\] ‘x measures y’
EVENT-CAUS-measure

b. \[m-an-[fa-i-fatra \rightarrow ma^{m} pifatra\] ‘z makes x be measured’
EVENT-CAUS-EVENT-I-measure
(Newell (2017b: 28), from Lisa Travis, field notes)

- The Ojibwe causative appears to be semantico-syntactically parallel to the productive causative in languages like Malagasy.
- We know from (9) that some suffixes are interpreted in a separate phase from their base.
- Both the POSSESSIVE and the CAUSATIVE suffixes (as is the case for all suffixes) undergo hiatus by deletion. If the Phonological Merger account were correct, these sequences should be resolved via epenthesis (or not at all).

(14) Phase 1 : akwe giwee
PWd Const: (akwe) (giwee)
Phase 2 : ni-akwee-im giwee-i?-a
PWd Constr: ni-(nia)(kwee)(im)-im (giwee)-(i?-a)^3
Hiatus Res: *(nida)(kwee:)dim) *(giwee)(i?a)
Phase 3 : --- nigiwe:i?a

- How can we account for the uniform behavior of hiatus resolution at the right edge as opposed to the varied nature of hiatus resolution at the left edge considering the parallel phonological/syntactic derivations of the outer affixes?

^3 Assuming the a is in the phase of cause, which it may not be. Further syntactic analysis is required.
4.0 **The CVCV Alternative**

- In CVCV, as we discussed, languages may opt to mark the beginning of phonological domains (constructed via phase spell-out) with an empty CV-unit. This CV unit marks only the left-edge, and is therefore an available explanation for the pattern seen in Ojibwe (following previous analyses, of which a survey is available in Scheer (2012b))
  - Note that the phase-based analysis in §3.2 gives us the necessary domains.
  - The advantage of the CV analysis is its ability to unify the deletion strategy of the inner and outer suffixes without falling afoul of the uniform predictions of Phonological Merger. That is, suffix boundaries are never impacted by a boundary CV since boundary CVs are never distributed phase-finally.
  - One point before we begin: vowels that are lexically specified for being long may be lexically long (i.e. attached to two vocalic positions) or short. In the latter case they carry a lexical instruction for spreading (while short vowels do not bear this instruction).

<table>
<thead>
<tr>
<th>length distinction expressed by representations in the lexicon</th>
<th>length distinction expressed by lexical instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>long</td>
<td>short</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>[\overrightarrow{a} \quad</td>
<td></td>
</tr>
</tbody>
</table>

- That is, association may be under control: the instruction to become long may originate in:
  - the lexicon – in Ojibwe, Ben Si Saïd (2014)
  - morphology – Guerssel & Lowenstamm (1990), Ben Si Saïd (2010, 2014)
  - socio-linguistic – liaison without enchaînement in French, Encrevé & Scheer (2005)
4.1 Hiatus in Ojibwe: The Basics

- Vowels that alternate with Ø are lexically floating; come with a V position to attach to if they are not deleted.
- A floating vowel in hiatus is deleted.
- Hiatus is determined at both the skeletal and melodic tier simultaneously. A melodic vowel sequence triggers the deletion of the affix vowel melody (floating) if the skeletal slot is local (no intervening V slots).
- A linked vowel is not deleted. (linking occurs after hiatus resolution at spell-out)
- A strong intervocalic C position is realized (epenthesis)

4.1.1 Hiatus Resolution via Deletion

- Suffixation inside and outside the phase; Prefixation inside the phase
- Vowel hiatus within a phase, and across a suffix-base boundary whether inside or outside the phase, is never mediated by empty CV space.

(15) Suffixation: Realization of and Hiatus resolution of short V

a. ni-ʒiʃiib-im-naani-ag → niʒiʃiibinaanig ‘our ducks’
   1-duck-POSSESSIVE-AGR-AGR

b. 

\[
\begin{array}{cccccccccccc}
\ & C & V & C & V & C & V & C & V & C & V & C & V \\
| & | & | & | & | & | & | & | & | & | & |
\end{array}
\]

... b Ø  i  m  Ø  i  n  a  n  i  a  g  Ø

→

c. 

\[
\begin{array}{cccccccccccc}
\ & C & V & C & V & C & V & C & V & C & V & C & V \\
| & | & | & | & | & | & | & | & | & | & |
\end{array}
\]

... b  i  m  i  n  a  n  i  g  Ø

- Hiatus is determined at both the skeletal and melodic tier simultaneously. A melodic vowel sequence triggers the deletion of the affix vowel melody (floating) if the skeletal slot is local (no intervening V slots).

(16) Suffixation: Realization of long V

a. wiğiwaam-eens → wiğiwaameens ‘little house, outhouse’
   house-DIM
b.

\[
\begin{array}{cccccc}
C & V & C & V & C & V \\
\mid & & \text{---} & \mid & \mid \\
... & m & \emptyset & e & n & \emptyset & s & \emptyset \\
\end{array}
\]

→

\[
\begin{array}{cccccc}
C & V & C & V & C & V \\
\mid & \text{---} & \mid & \mid \\
... & m & e & n & \emptyset & s & \emptyset \\
\end{array}
\]

(17) Suffixation : Hiatus resolution of long V

a. aseemaa-eens → aseemaans ‘cigarette’
   tobacco-DIMINUTIVE

b.

\[
\begin{array}{cccccc}
V & C & V & C & V & C & V \\
\mid & \text{---} & \mid & \mid \\
... & a & e & n & \emptyset & s & \emptyset \\
\end{array}
\]

→

\[
\begin{array}{cccccc}
V & C & V & C & V & C & V \\
\mid & \mid \\
... & a & n & \emptyset & s & \emptyset \\
\end{array}
\]

• The affix vowel melody (floating) if the skeletal slot is local (no intervening V slots).

(18) Prefixation : Hiatus resolution of short V\(^4\)

a. ni-oos → noos
   ‘my father’
   1-father

---

\(^4\) The only prefixes that are realized within the phase of their base are the person prefixes, and only in inalienable constructions. All of these prefixes contain short vowels.
b. 
\[
\begin{array}{ccccccc}
\text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} \\
\mid & \mid & \text{o} & \text{s} & \text{Ø} \\
\text{n i} & \text{os} \\
\end{array}
\]

→

\[
\begin{array}{ccccccc}
\text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} \\
\mid & \text{ag} & \text{am} & \text{O} \\
\text{n} & \text{o} & \text{s} & \text{Ø} \\
\end{array}
\]

- The affix vowel melody (floating) if the skeletal slot is local (no intervening V slots).

5.1 **Prefixation outside the phase: long vs short vowels**

- The empty V of the phase-intial CV intervenes and blocks hiatus resolution via deletion.
- Long vowels – no resolution because they fill the extra CV space. The initial C of the base is therefore governed (its expression is suppressed)
- Short vowels – epenthesis before an empty CV because the initial C of the base is licensed and strong, epenthesis is fortition in Ojibwe.

(19) Long vowels: No pre-linking Hiatus, no post-linking Hiatus resolution

a. gii-aagam-osee → giiaagamosee ‘He walked in snowshoes’

PAST-snowshoe-walk

b. 
\[
\begin{array}{ccccccc}
\text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} \\
\mid & \mid & \text{ag} & \text{am} & \text{O} \\
\text{g i} & \text{a} & \text{g am o s e} \\
\end{array}
\]
• Intervening V slot of the initial CV bleeds the environment for hiatus resolution.

c. 

\[
\begin{array}{cccccccccccc}
\text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} \\
g & \text{i} & \text{a} & \text{g} & \text{a} & \text{m} & \text{o} & \text{s} & \text{e}
\end{array}
\]

\[\text{licenses}\]

• Linked vowels are not subject to hiatus resolution. The intervening C is governed, and therefore unrealized.

(20) Short vowels: No pre-linking hiatus, post-linking hiatus resolution by epenthesis

a. ga-aagam-osee → gadaagamosee ‘He will (probably) walk in snowshoes’
FUT.PROB-snowshoe-walk

b. 

\[
\begin{array}{cccccccccccc}
\text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} \\
g & \text{a} & \text{a} & \text{a} & \text{g} & \text{a} & \text{m} & \text{o} & \text{s} & \text{e}
\end{array}
\]

• Intervening V slot of the initial CV bleeds the environment for hiatus resolution.

c. 

\[
\begin{array}{cccccccccccc}
\text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} \\
g & \text{a} & \text{d} & \text{a} & \text{g} & \text{a} & \text{m} & \text{o} & \text{s} & \text{e}
\end{array}
\]

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5.0 **Conclusions**

- **Ojibwe Hiatus Resolution**
  - Phases/cycles play a crucial role in the determination of hiatus resolution in Ojibwe.
  - A PWd analysis of phonological domains predicts that some suffixes will trigger hiatus resolution via epenthesis, contra the data.
  - A linear analysis better captures the environments for Hiatus Resolution determined by phases à la N&P.

- **Larger Conclusions**
  - If the Prosodic Hierarchy is not a tenable theoretical construct, we need to take seriously alternate theories of phonological domain construction, like phases + CVCV.
  - Interestingly, there is a strong cross-linguistic tendency for suffixes to behave as if they were phonologically closer to their base than prefixes. The analysis herein, in addition to offering a modular and syntactically licit account of Ojibwe hiatus resolution, promises an interesting line of research in accounting for this tendency.
References


Pak, M. (2008). The postsyntactic derivation and its phonological reflexes, Ph.D
dissertation, University of Pennsylvania.